

III. "On the Normal Paraffins." By C. SCHORLEMMER, F.R.S.  
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(Abstract.)

Some of the results of this research have already been published in two previous communications\*. It was there pointed out that the constitution assigned to the normal paraffins (*i. e.* that they contain the carbon atoms linked together in a single chain) was ascertained partly by preparing them by synthesis from other normal compounds, and partly by studying the oxidation products of the alcohols obtained from them. The best method to prepare these alcohols is to pass a current of dry chlorine into the vapour of the boiling hydrocarbon; a mixture of a primary and a secondary chloride is obtained†, and these, by heating the mixture with glacial acetic acid and potassium acetate to 20°, are completely decomposed, the primary chloride yielding the corresponding acetate, whilst the secondary compound partly splits up into an olefine and hydrochloric acid, and partly is converted into the acetate of the secondary radical. By treating the acetates with an alcoholic solution of caustic potash, the alcohols are formed, which can be only approximately separated by fractional distillation, as the difference between their boiling-points is only about 10°.

*Pentane or normal amyl hydride*,  $C_5H_{12}$ , boiling at 37°–39°, is found in considerable quantity in Pennsylvania petroleum. The secondary pentyl alcohol or *methyl-propyl carbinol*,  $\begin{matrix} C\ H_3 \\ \{ \\ C_3\ H_7 \end{matrix} CH\ OH$  (boiling-point 120°–122°), gives on oxidation *methyl-propyl ketone*,  $\begin{matrix} C\ H_3 \\ \{ \\ C_3\ H_7 \end{matrix} CO$ , which on further oxidation splits up into acetic acid and propionic acid. The *primary pentyl alcohol* is identical with the normal amyl alcohol, which Lieben and Rossi obtained from normal butyric acid, and yields on oxidation *normal valeric acid*, boiling at 184°–187°.

*Hexane or normal hexyl hydride*,  $C_6H_{14}$ .—(1) *Hexane* from petroleum, boiling at 69°–70°, yields the following derivatives:—(a) *Methyl-butyl carbinol*,  $\begin{matrix} C\ H_3 \\ \{ \\ C_4\ H_9 \end{matrix} CH.OH$  (boiling-point 140°–142°), the oxidation products of which consist of *methyl-butyl ketone*,  $\begin{matrix} C\ H_3 \\ \{ \\ C_4\ H_9 \end{matrix} CO$ , and acetic acid and *normal butyric acid*. (b) *Primary hexyl alcohol*, boiling at 150°–155°, from which *caproic acid*, boiling at 201°–204°, was obtained.

(2) *Hexane* from mannite was obtained by acting with hydrochloric acid and zinc upon the secondary hexyl iodide prepared from mannite. It boils at 71°·5, and its specific gravity at 17° is 0·6630. The deri-

\* Proc. Roy. Soc. vol. xix. pp. 20 & 487.

† The same mixture is obtained by the action of chlorine in the cold, or in presence of iodine; but at the same time a large quantity of higher chlorinated substitution products is formed, which is not the case by acting with chlorine on the vapour.

vatives were the same as those of the hexane from petroleum; it must, however, be stated that the boiling-points of some were a little higher than those of the petroleum hydrocarbon, and there was also a marked difference observed between the two caproic acids. That from mannite gave a well-crystallized barium-salt, whilst that from petroleum could only be obtained in the amorphous state; but as the two secondary alcohols yield both normal butyric acid, the chemical constitution of the two hexanes must be the same.

(3) *Dipropyl*.—This hydrocarbon was prepared by acting with sodium on primary propyl iodide; boiling-point  $69^{\circ}$ - $70^{\circ}$ ; specific gravity at  $17^{\circ}=0.6630$ . The quantity obtained was too small for further investigation; but the mode of its formation shows that it must have the same constitution as the two other hexanes.

*Heptane or normal heptyl hydride*,  $C_7H_{16}$ ; boiling-point  $97^{\circ}5$ - $99^{\circ}$ .—This hydrocarbon, which is also found in petroleum, gives a secondary alcohol (boiling-point  $160^{\circ}$ - $162^{\circ}$ ), which is *methyl-pentyl carbinol*  $C_6H_5\left\{CH_3\atop C_5H_{11}\right\}CH_2OH$ , as the acetone obtained from it yields on oxidation acetic acid and *normal valerianic acid*. The primary heptyl alcohol boils at  $170^{\circ}$ - $172^{\circ}$ ; on oxidizing it, *oanthylic acid*, boiling at  $219^{\circ}$ - $222^{\circ}$ , was formed, which was found to be identical with the acid obtained from castor-oil.

*Octane or normal dibutyl*,  $C_8H_{18}$ , is easily obtained by the action of sodium on normal butyl iodide. It boils at  $123^{\circ}$ - $125^{\circ}$ , and has at  $17^{\circ}$  the specific gravity  $0.7032$ . As the octane from methyl-hexyl carbinol, as well as that which Zincke obtained from primary octyl alcohol, have the same boiling-points and specific gravities, it appears most probable that these three hydrocarbons are identical.

#### IV. "Note on the Eclipse of the Sun (Dec. 1871) as observed at Sholoor." By M. JANSSEN. Communicated by the PRESIDENT. Received January 15, 1872.

MONSIEUR LE PRÉSIDENT,—J'aurai l'honneur d'adresser à la Société Royale de Londres un mémoire détaillé de mes observations de l'éclipse, mais je profite du départ de ce courrier pour vous informer des principaux résultats obtenus.

Sans entrer dans une discussion qui fera partie de ma relation, je dirai d'abord que la magnifique couronne observée à Sholoor s'est montrée sous un aspect tel, qu'il me paraissait impossible d'admettre ici une cause de l'ordre de phénomènes, ou de diffraction, ou de réflexion sur le globe lunaire, ou encore de simple illumination de l'atmosphère terrestre.

Mais les raisons qui militent en faveur d'une cause objective et circumsolaire, prennent une force invincible quand on interroge les éléments lumineux du phénomène.